12. A device for alerting the driver of a vehicle trailing a host vehicle when a forward traveling vehicle forward of said host vehicle is decelerating comprising:

(a) a radar device, mounted integrally with said host vehicle, with means to continuously measure a relative speed of said forward vehicle relative to said host vehicle;

(b) a CPU, mounted integrally with said host vehicle, with means to ascertain a relative acceleration from said relative speed, with further means to ascertain said host vehicle's acceleration relative to the road from data provided by electronic connection to said host vehicle's speedometer system, with further means to derive an absolute acceleration of said forward vehicle relative to the road by computing the mathematical sum of said relative acceleration plus said host vehicle's acceleration, and with further means to continuously monitor said absolute acceleration for significant negative values;

(c) a CPU controllable luminous display, mounted integrally with said host vehicle, sufficiently bright and strategically positioned to be visible to the driver of a vehicle trailing said host vehicle, activated whenever a significant negative value in said absolute acceleration of said forward vehicle occurs.

REMARKS – General

Claim Rejections – 35 U.S.C. § 112

Claims 1-11 were rejected under 35 U.S.C. 112 as being '*indefinite for failing to point out and distinctly claim the subject matter which applicant regards the invention*'.

Applicant, pro se, apologizes for the lack of clarity in the terminology used to draft the previously submitted specifications and claims - especially with the use of the terms "invention-equipped vehicle" and "radar-equipped vehicle". Applicant has rewritten and combined claims 1 and 2 into substitute claim 12 to define the invention more particularly and distinctly so as comply with the request of the OA. In particular, the use of the term 'host vehicle' to refer to the vehicle in which the device is mounted is consistent with the terminology in the prior art and more precisely descriptive.

Claim 12 may initially appear wordy, but it is important for the clear understanding of the invention that a distinction be made between three different co-moving vehicles: a "forward moving forward vehicle" (the vehicle forward of the host vehicle); a "host vehicle"; and a "trailing vehicle" (the vehicle trailing the host vehicle). It is also important that a clear distinction be made between "relative acceleration", "host vehicle acceleration" and a "forward vehicle absolute acceleration". The "relative acceleration" is the difference in acceleration between the forward moving forward vehicle and the host vehicle; "host vehicle acceleration" is the acceleration derived from changes in speed from the host vehicle's speedometer; and "forward vehicle absolute acceleration" is the acceleration that the forward vehicle experiences relative to the road. Applicant has endeavored to be as concise as possible in re-writing the claims while still making these distinctions.

Applicant agrees with the OA's rejection of claims 3 - 11 for the reasons cited by The Examiner. Claims 1 and 2, now re-written as claim 12, better defines the subject matter of the invention. **The following discussion of claim 12 points to an invention that is unique, unobvious, unanticipated, and clearly distinct from Matsumoto's patent and the prior art.**

Claim Rejections – 35 U.S.C. § 102

Claims 1,2,4,5,7,9, and 10 were rejected under 35 U.S.C. 102 as being '*anticipated by Matsumoto*'.

Applicant has withdrawn claims 4,5,7,9 and 10.

Claim 12 points to an invention that is dissimilar to the object of Matsumoto's patent and any anticipated additions of his patent for the following reasons:

1. **Nowhere in Matsumoto's patent are there provisions for - or reference made – to an intent, an object, or even a suggestion to inform the driver of a vehicle *trailing***

the host vehicle of an impending traffic condition. Nor does his patent indicate anywhere the understanding of the value in notifying the *trailing* driver. On page 1, in Matsumoto's summary of his invention, he states as his object a "device for giving information to help a driver to drive the vehicle according to the detected conditions of the road". The *driver* he is referring to is the *driver of the host vehicle.* This is made clear in his drawings such as in Fig. 1 wherein alarm generating portion **4**, speaker **5**, and display **6** are shown to be part of the same host vehicle housing radar **1** and speed sensor **2**. Claim 12 in applicant's patent shows that the object of applicant's invention is to inform the *driver of a vehicle trailing the host vehicle* of an impending traffic stoppage, not the driver of the host vehicle. This is accomplished by the activation of luminous display **30** and shown in applicant's Fig. 4 clearly in a position to be viewable by the driver of trailing vehicle **50**.

2. **Matsumoto's patent teaches how to provide correction factors for establishing a *proper intervehicular distance.* Applicant's patent rejects the notion that proper intervehicular distance is a useful criterion and teaches the unobvious advantages of *deceleration independent of distance.*** Prior art patents as far back as 1958 - such as Pat. No. 2,851,120 issued to Fogiel (referred to in Applicant's specifications) - often utilize intervehicular distance as a criterion for alarm activation. Fogiel states, "a range finder and calculating device determines a safe travel distance for the vehicles". Matsumoto tries to improve on this. On page 3, line 19, Matsumoto teaches us about his device which includes "the computer control portion that determines a proper intervehicular distance" for safe travel. Then, to establish how his invention is different from the prior art, on page 3, line 22, he states "an improvement according to the present invention is made to provide a light-switch operation detector" and later on page 5, line 18 he provides a "wiper-switch operation detector" each of which are used to derive a "corrected proper intervehicular distance". Matsumoto provides tables for these correction factors, and in both cases they are used to determine when the driver of the host vehicle should be alerted. Applicant shows below that the use of intervehicular distance leads to numerous

flaws and, rather, in an unobvious way, the use to the forward vehicle's deceleration is a preferred trigger for an alarm mechanism.

Matsumoto anticipates the extension of his invention on pages 7-11 wherein other driving conditions might be further considered including on page 7, line 11 "means for judging the response of the driver" and on page 10, line 15 "an accelerator operation detector". Matsumoto is essentially teaching us about adding more and more detectors to a host vehicle that would each be used to provide correction factors and better establish a proper intervehicular distance - **always *intervehicular distance***.

3. **It is unobvious why monitoring the *deceleration* of a forward vehicle, *with the explicit disregard of intervehicular distance,* can produce a technical advantage for some collision avoidance devices.** Matsumoto's patent, assigned to Honda, and Stopczynski et al.'s patent, assigned to Ford Global Technologies, and most of the prior art in this field define devices that start by evaluating intervehicular distance. This might be considered the logical starting point for collision avoidance; define an acceptable intervehicle distance for various traffic conditions and then activate an alarm whenever the actual intervehicle distance becomes less than that. Only with more thorough analysis is it revealed that there are serious flaws with such system. Several of these flaws are pointed out below, and despite the plethora of experienced high technology companies and logical thinking individuals in the field, the flaws inherent to such systems have not been anticipated.

Flaw Number 1:

Highway safety guidelines recommend that approximately one car length of intervehiclar separation be maintained for every 10 mph of vehicle speed. Thus, at 60 mph the recommended separation is six vehicles in length, or about 100 feet. If an alerting device uses such a criteria for determining when to activate an alarm, then what happens when the traffic density is high and the intervehicular distance is less than 100 feet? Any device such as the one Matsumoto describes (reference his Fig. 6

– condition: $\ell < L''$) will continuously sense the shorter than proper intervehicular distance and continuously keep the alarm signal activated. The flaw with such a design is that when driving for extended periods in high-density traffic with the alarm already activated, no subsequent warnings triggered by shorter than proper intervehicular distance can be given. At the opposite end of the spectrum, if a short intervehicular distance is used for the proper distance, then when the driver encounters a lower traffic density – perhaps only a few moments later – the alarm will not be triggered until the host vehicle is too close to the impending stoppage to be of value. There are no provisions in Matsumoto's patent to correct for this anomaly. Modification of his invention to include a series of alarms would produce a device that – like the boy who cried wolf once to often – would likely be ignored. **Indeed, there is no obvious answer to this flaw unless a continuous correction to the proper intervehicular distance can be made in real time to account for the continuously changing traffic density - which is technologically more challenging and leads to numerous other pitfalls. Intervehicular distance is not a good criterion when traffic density varies from moment to moment.**

Flaw Number 2:

A proper intervehicular distance is established for a specific vehicle and incorporated into the alarm device of Matsumoto's. Consider multiple drivers using the same vehicle. The proper intervehicular distance for an aggressive-minded risk-taking 25-year-old male is not likely to be the same for his 80-year-old grandfather with failing vision. And although Matsumoto teaches us on page 7, line 21, the use of a "response discriminator" which can measure and average the history of response times a driver takes to react to an alarm, it requires a response history before an adjustment can be made. If the proper intervehicular distance of the host vehicle has been set for the 25 year old mentioned above, and his grandfather borrows the car, then, in an emergency, the alarm will likely come too late to be of any value. **Intervehicular distance is not a good indicator when multiple drivers use the same vehicle.**

Flaw Number 3:

Matsumoto's patent, wherein correction factors to the recommended intervehicular distance are used when the host vehicle lights or wipers are on, has other flaws. First, regarding the correction for lights: some roadways legally require drivers to turn on their lights during the daytime to increase safety; at other times a driver turns their lights on when traveling through a lighted tunnel; and some vehicles have their lights continuously on when driving - day and night. Under such circumstances, the correction factors to the *intervehicular distance* would be wrongly applied. A similar argument can be found with the correction used for windshield wipers. Individuals turn on their windshield wipers at different levels of rainfall. Some prefer not to have their vision distracted by the motion of the wiper while others activate them when the first raindrops hit the windshield. Correction factors for one driver may be wrongly applied for another driver. Further, after a rainfall has ended there is no need to activate the wipers. Yet if the rainfall was significant, the roads will remain wet. Matsumoto's device makes no provisions for such situations, and thus no correction factor for the slippery road would be applied. The *proper intervehicular distance* would be incorrectly calculated and the alarm signal would be activated too late - **essentially nullifying the improvement Matsumoto hoped to make with his device.**

4. **The two essential objects of applicant's invention are: alerting the *trailing driver* rather than the *host driver* of a change in traffic, and the use of *forward vehicle deceleration* rather than *intervehicular distance* as a trigger for an alarm. Neither of these objects are referred to or anticipated in Matsumoto's patent.**

Claim 12 in applicant's invention monitors *deceleration of the forward vehicle* to trigger for an alarm. Such a device has the following advantages:

1. **Consistency**: the device functions the same independent of traffic density, road conditions, and driver capabilities.

2. **Understandability**: because of it's consistent operation the device is easily understood. The importance of this advantage cannot be overstated. Any device that is to be used effectively by the general population must be readily and universally understood and not subject to the users own interpretation. The operation of applicant's device would function very similarly to standard prior art brake lights – only rather than convey the braking intensions of the host vehicle, it would convey the braking intentions of the vehicle forward of the host vehicle.

3. **Quicker Operation**: by eliminating the reaction time of the host driver, applicant's invention provides a more rapid alert to a driver trailing the host vehicle. Eliminating the half-second or so reaction time between when a host driver observes a forward vehicle slowing and the moment the host driver applies the brakes translates into 44 feet of vehicle travel at freeway speeds.

4. **Effectiveness for Reducing Chain Collisions**: by alerting the trailing driver, rather than the host driver of an impending reduction in speed, there is a greater likelihood a sudden stoppage in dense traffic flow will not lead to a chain reaction collision between multiple vehicles. For even if a host driver's attention is distracted when a stoppage occurs and that driver never apply their brakes (never activating the prior art brake lights) the driver trailing a vehicle incorporating applicant's invention would still be alerted to the stoppage – thus reducing the probability that they become involved in a collision.

Claim Rejections – 35 U.S.C. § 103

Claims 6 and 11 were rejected under 35 U.S.C. 103(s) as being '*unpatentable over Matsumoto as applied to claims 1 and 7*' and claims 3 and 8 for the same reason '*and further in view of Stopczynski et al.*'

Applicant has withdrawn claims 6 and 11.

Conclusion

For all of the above reasons, applicant submits that the claims are now in proper form, and that the claims define patentability over the prior art. Therefore applicant submits that this application is now in condition for allowance, which action is respectfully solicited.

Substitute Specification Option

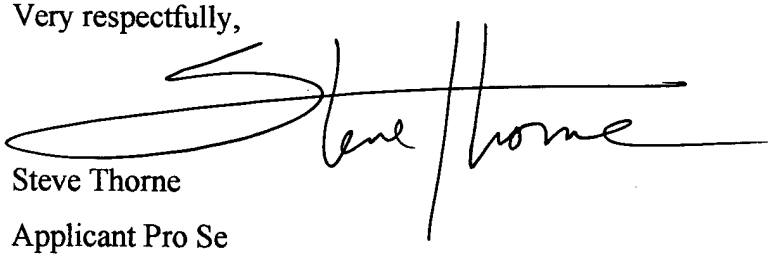
However, given applicant's removal of reference to elements 36 *dashboard warning light* and 38 *warning buzzer* from the claims, and the numerous locations where the term "radar-equipped vehicle" has been replaced with the term --host vehicle--, if The Examiner believes the patent would be more clear with the removal of these terms throughout the specifications and drawings, applicant would be happy to comply and submit a Substitute Specification.

Conditional Request for Constructive Assistance

Applicant has amended the claims of this application so that they are proper, definitive, and define novel structure that is also unobvious. If, for any reason this application is not believed to be in full condition for allowance, applicant respectfully requests the

constructive assistance and suggestions of The Examiner pursuant to M.P.E.P [section] 2173.02 and [section] 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,



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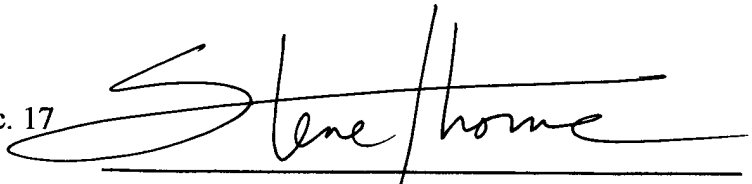
2004 Dec. 17 

Steve Thorne, Applicant